

# PATENT SPECIFICATION

(11)

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- (21) Application Nos. 49839/72 (22) Filed 30 Oct. 1972 (19)  
1734/73 12 Jan. 1973
- (23) Complete Specification filed 29 Oct. 1973
- (44) Complete Specification published 18 Aug. 1976
- (51) INT. CL.<sup>2</sup> B24B 31/08
- (52) Index at acceptance  
B3D 1M 7  
A2Q 16X 23
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## (54) IMPROVEMENTS IN OR RELATING TO ROTOR AND STATOR ASSEMBLIES

(71) We, IMPERIAL CHEMICAL INDUSTRIES LIMITED, Imperial Chemical House, Millbank, London, SW1P 3JF, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to rotor and stator assemblies. U.K. Patent Specification 1,166,864 discloses an apparatus comprising a dished rotor and a vertical walled stator which is used to produce a toroid of small abrasive particles in the finishing of metal workpieces. Various means of effecting a seal between the rotor and the stator were proposed in the above patent specification, the purpose of such a seal being to prevent the escape of particles through the gap between the rotor and the stator. All the means disclosed involved the frictional engagement of the rotor and stator, with consequent lowering of efficiency in the motor powering the rotor, and build up of undesirable heat in the region of the rotor edge.

We have now discovered that a satisfactory solution to these problems may be obtained between the rotor and the stator simply by providing a sufficiently small air gap between these parts.

Accordingly we provide a rotor and stator assembly wherein the rotor is dished and provides a face at its edge in parallel alignment with a corresponding face provided by the stator and separated therefrom by a diametral clearance within the range 0.0005 to 0.05 inches.

A preferred diametral clearance between the rotor and stator is within the range 0.001 to 0.025 inches.

Preferably the rotor is arranged to rotate about a substantially vertical axis and the face provided by its edge is vertical.

Either or both of the corresponding faces may have a groove or grooves cut into

them. Such grooves may in practise be filled with a lubricant or grease.

In order that the invention may be more clearly understood specific embodiments thereof will now be described with reference to the accompanying drawing in which — Fig. 1 is a sectional view through a rotor and stator assembly according to the invention; and Figs. 2, 3 and 4 are sectional views of alternative arrangements in the region of the rotor edge to that shown in Fig. 1.

Figure 1 shows a dished circular rotor 1 mounted within a right vertical cylindrical stator 2 which is closed at its lower end. The rotor is mounted on a vertical shaft 3 and powered by a motor and gear box assembly 4. The circumferential edge of the rotor is provided with a smooth surface 5 which is parallel to the similarly smooth surface of the inside of the stator 2. These surfaces are not actually in contact but separated by a small distance, the diametral clearance being about  $0.002 \pm 0.0005$  inches.

Figure 2 shows a similar arrangement where the surface of the rotor is provided with a circumferential groove 6 into which grease may be packed.

Figure 4 shows a similar arrangement also, but in this case the stator surface is provided with two such circumferential grooves.

Figure 3 shows an alternative arrangement where the stator wall is provided with an internal circumferential ridge 7 of triangular cross-section, one face of which is in parallel alignment with the face provided by the rotor edge.

The rotor and stator assemblies of the type described hereinabove are suitable for use as mixers, and especially suitable for use in apparatus for the application of chemicals to seeds, for example the apparatus disclosed and claimed in U.K. Patent Specification No. 1,417,694.

### WHAT WE CLAIM IS:—

1. A rotor and stator assembly forming

- a container for particulate material, wherein the rotor is dished and is arranged to rotate about a substantially vertical axis within the stator, and provides a face at its edge in parallel alignment with a corresponding face provided by the stator and separated therefrom by a diametral clearance within the range 0.0005 to 0.05 inches; the clearance being such as to provide a seal preventing escape of the particles between the rotor and stator.
2. A rotor and stator assembly as claimed in claim 1 wherein the diametral clearance is within the range 0.0001 to 0.025 inches.
3. A rotor and stator assembly as claimed in either of claims 1 and 2 wherein the face provided by the edge of the rotor is vertical.
4. A rotor and stator assembly as claimed in any of claims 1 to 3 wherein the face provided by the edge of the rotor, or the face provided by the stator, has a circumferential groove or grooves cut into it, or wherein each face is provided with at least one such groove.
5. A mixer comprising a rotor and stator assembly as claimed in any of claims 1 to 4.
6. Apparatus for the application of chemical to seeds comprising a rotor and stator assembly as claimed in any of claims 1 to 4.
7. Rotor and stator assemblies, as claimed in claim 1 substantially as herein described with particular reference to and as shown in any of the accompanying drawings.
- N. D. BISHOP,  
Agent for the Applicants.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1976.  
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY  
from which copies may be obtained.

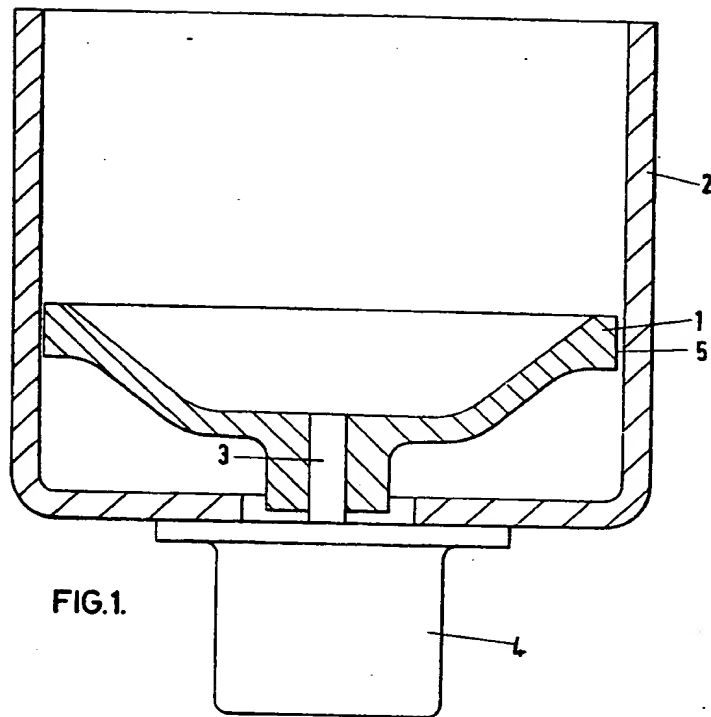


FIG. 1.

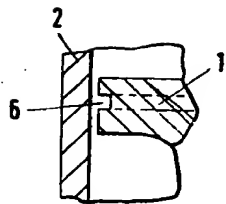


FIG. 2.

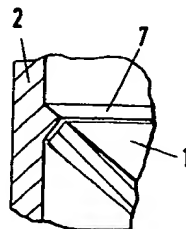


FIG. 3.

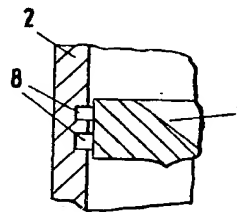


FIG. 4.

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